**MODULE 4 ANALOG PROGRAMMING BLOCKS**

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| **Practical tasks**  **Lab activity 1:** Connecting potentiometer to LOGO! | | |
| **Objective:** To use potentiometer as an analog input with LOGO! Controller.  You are required to connect a 10KΩ potentiometer to LOGO! Controller that uses 24V power supply, to do so a resistor is required   1. Calculate the required resistance.   Brown Yellow Orange  If this value is not available in the lab 15K can be used   1. Connect the potentiometer and a light bulb indicator to the LOGO! Controller as shown in figure 4.12:  |  | | --- | | untitled.bmp | | Figure 4.12 Connecting potentiometer to LOGO! |  1. Is it possible to connect the potentiometer to I1 or I2? Why?   NO, it will not be useful to connect a potentiometer to I1 or I2 since these two inputs are digital inputs while potentiometer is an analog input so it can be connected either to I7 or I8   1. Use the LOGO! Soft comfort software to create the following FBD:  |  | | --- | | untitled.bmp | | Figure 4.13 FBD for potentiometer task |  1. What is the name of the programming block B001?  Analog threshold trigger  1. What is the function of the programming block B001?   It is used to set or reset an output depending on two configurable  thresholds and analog input   1. For B001 programming block, what is the type of the input signal and output signal?   The input signal is analog signal while the output signal is digital signal   1. Download and run the previous FBD. Then use the left and right arrows on the LOGO! Controller to display the status of the analog inputs AI.      1. Rotate the potentiometer and notice the values appear on the display unit. Write your observations.   While rotating the potentiometer the input voltage to LOGO! Controller  Changes between 0 and 10 V DC and the values appear on the LOGO! Display unit varies between 0 and 1000.   1. When does the light go ON? When does it go OFF?   It goes ON when the input value reaches 600🡪6 V and stays ON until this value goes below 400🡪4 V   |  | | --- | | untitled.JPG | | Figure 4.14 Connecting potentiometer to LOGO! | | | |
| **Lab activity 2:** Connecting potentiometer to LOGO! |
| **Objective:**  adjust the ON/OFF delay timers’ parameter using  Potentiometer.     1. Use the same circuit in task 1, and create an FBD that displays the input voltage on the LOGO! Display unit. The light should go ON if the input voltage is in the range of 3-7 V.   Simulate and test your program.   |  | | --- | | untitled.bmp |  1. In the previous control circuit, connect a normally open pushbutton to I1. Then create a program that enables the user to turn ON the light for adjustable time duration (1-100sec) using the potentiometer.   Show the timing on the display unit.     |  | | --- | | untitled1.bmp | |

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| **Lab activity 3:** Analog comparator and Analog amplifier |
| **Objective:**  To use Analog comparator programming block    Two heaters are used to heat 2 different chemicals; one is connected to Q1 and the other is connected to Q2, each chemical tank has a thermocouple followed by an electronic amplifier, it gives voltage in the range of 0-10 V, one thermocouple is connected to I7 to monitor the first chemical temperature and the other is connected to I8 to monitor the second chemical temperature, create an FBD that keeps both chemicals at the same temperature.  Simulate your program.   |  | | --- | | untitled1.bmp | |